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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/665,298	09/17/2003	Michael C. Green	005513P018	5448

7590 01/04/2005  
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EXAMINER

LE, THAO X

ART UNIT PAPER NUMBER

2814

DATE MAILED: 01/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/665,298

Applicant(s)

GREEN ET AL.

Examiner

Thao X. Le

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 06 December 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-37 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-37 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 September 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 09/17/03.
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Applicant's election without traverse of claims 1-37 in the reply filed on 12/06/04 is acknowledged. Claims 38-48 are canceled.

### ***Drawings***

2. Figures 1A-1C should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.121(d)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Specification***

3. The disclosure is objected to because of the following informalities: in pages 3-4, number 283, 284, 285 and 286 should read 183, 184, 185 and 186, respectively.

Appropriate correction is required.

***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-9, 14, 16-18, 20-37 are rejected under 35 U.S.C. 102(b) as being anticipated by WO 02/067014 to Harel et al.

Regarding claim 1, Harel discloses a photodetector in fig. 14, comprising: a plurality of semiconductor materials forming a heterojunction, the plurality of semiconductor materials comprising: a first semiconductor material 4; a second semiconductor material 5 coupled to the first semiconductor material 4, the first and second semiconductor materials being halides, page 30 second and third paragraphs.

Regarding claims 2-4, 18, Harel discloses the photodetector wherein the first and second semiconductor materials have approximately the same band gap, wherein the first semiconductor 4 comprises a lead iodide compound, page 30 line 23 and the second semiconductor material comprises mercuric iodide, page 30 line 28.

Regarding claim 5, Harel discloses the photodetector further comprising: a first contact (bottom electrode), page 30 line 20; and a second contact 6, page 30 line 32, wherein the first plurality of semiconductor materials are disposed between the first and second contacts.

Regarding claim 6, Harel discloses the photodetector wherein at least one of the first and second contacts comprises palladium, see claims 18 or 19.

Regarding claims 7-9, Harel discloses the photodetector wherein the second semiconductor material comprises mercuric iodide and the first semiconductor material is less chemically reactive than mercuric iodide with the contacts, wherein the first semiconductor material 4 has a thickness about 200  $\mu\text{m}$ , page 31 line 25.

Regarding claims 14, 20, Harel discloses the photodetector further comprises a third semiconductor material comprising lead iodide couples to the second semiconductor material 5, page 31 lines 11-17.

Regarding claims 16-17, Harel discloses the photodetector wherein the second semiconductor material has a conductivity type different than the first semiconductor material, page 31 line 8, wherein the band gap of the first and second semiconductor material are within 10 percent of each other. Although the prior art does not specially disclose the claimed band gap, this feature is seen to be inherently teaching of that limitation because of the material properties.

Regarding claims 21-26, Harel discloses the photodetector wherein at least one of the first and second semiconductor materials comprises iodide compound, page 30 line 28 and wherein the first semiconductor material comprises bismuth iodide, see claim 9, wherein the second semiconductor 5 comprises mercuric iodide, page 30 line 28, wherein the first semiconductor layer 4 comprises lead iodide, page 30 line 23.

Regarding claims 27-29, Harel discloses the photodetector is coupled to a negative bias, wherein the first contact is coupled to ground and the second contact is coupled to a negative voltage, fig. 2.

Regarding claim 30, Harel discloses a photodetector in fig. 14, comprising: a first semiconductor material 4; a second semiconductor material 5 coupled to the first semiconductor material forming a heterojunction structure; a contact 6 coupled to the second semiconductor material, wherein the first and second semiconductor materials comprise means for reducing a chemical reaction with the contact; and means for reducing dark current in the heterojunction structure. Harel discloses the structure substantially identical to that of the claims (layer 4 of Harel is a means for reducing a chemical reaction and reducing dark current), claimed properties or functions are presumed to be inherent. *In re Best*, 195 USPQ 430, 433 (CCPA 1977).

Regarding claim 31, Harel discloses a photodetector in fig. 14, comprising: a first semiconductor material 4; and a second semiconductor material 5 coupled to the first semiconductor material; and a contact 6 coupled to the second semiconductor material 5, wherein the second semiconductor material is less corrosive than the first semiconductor material to the contact. Although the prior art does not specially disclose the claimed less corrosive, this feature is seen to be inherently teaching of that limitation because of the material properties.

Regarding claims 32-37, Harel discloses the photodetector wherein the first and second semiconductor materials are halides or iodide, wherein the first and second semiconductor material is lead iodide and mercuric iodide, respectively, page 30 lines 23 and 28, wherein first semiconductor material 4 is bismuth iodide, see claim 9.

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claims 10-13, 15, 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 02/067014 to Harel et al.

Regarding claims 10-13, 15, 19 Harel does not disclose the photodetector, wherein the first semiconductor material 4 has a first thickness less than approximately 50 microns, wherein the thickness of the second semiconductor material 5 is thicker than the first semiconductor material 4.

However, Harel discloses the photodetector wherein the first semiconductor material 4 has a thickness about 200  $\mu\text{m}$ , page 31 line 25, and the second semiconductor material 5 has the thickness about 150  $\mu\text{m}$ , page 29

line 29. Accordingly, it would have been obvious to one of ordinary skill in art to use thickness teaching of Harel in the range as claimed, because it has been held that where the general conditions of the claims are disclosed in the prior art, it is not inventive to discover the optimum or workable range by routine experimentation. See *In re Aller*, 220 F.2d 454, 105 USPQ 233, 235 (CCPA 1955).

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thao X. Le whose telephone number is (571) 272-1708. The examiner can normally be reached on M-F from 8:00 AM - 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael M. Fahmy can be reached on (571) 272 -1705. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.


Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Application/Control Number: 10/665,298  
Art Unit: 2814

Page 8

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21 Dec. 2004



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